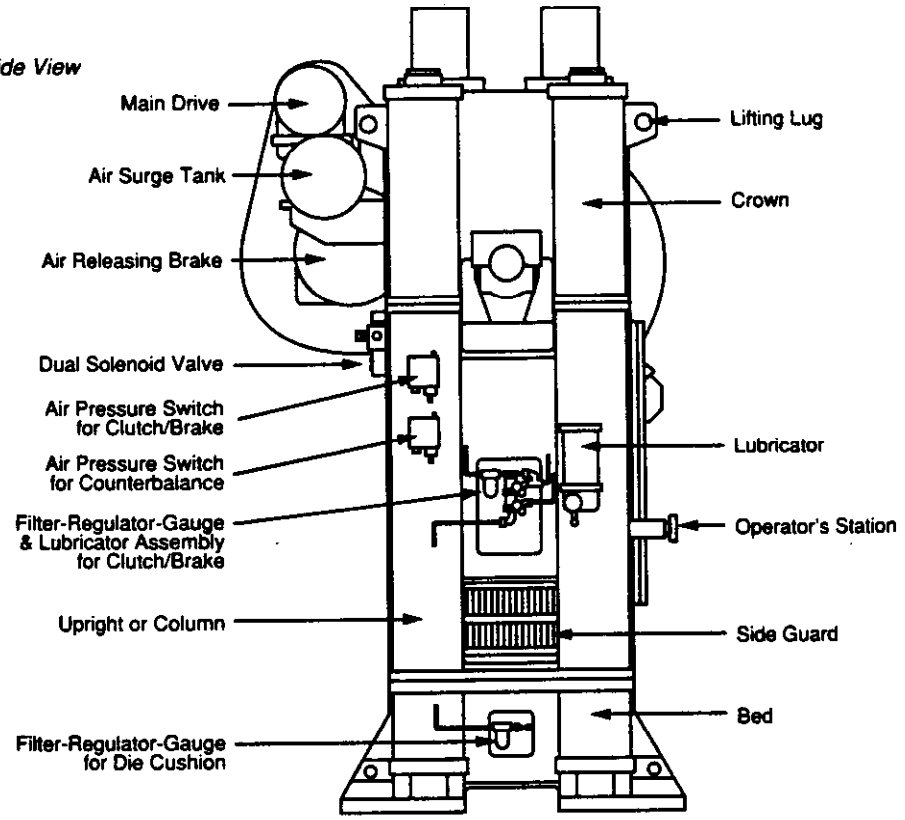
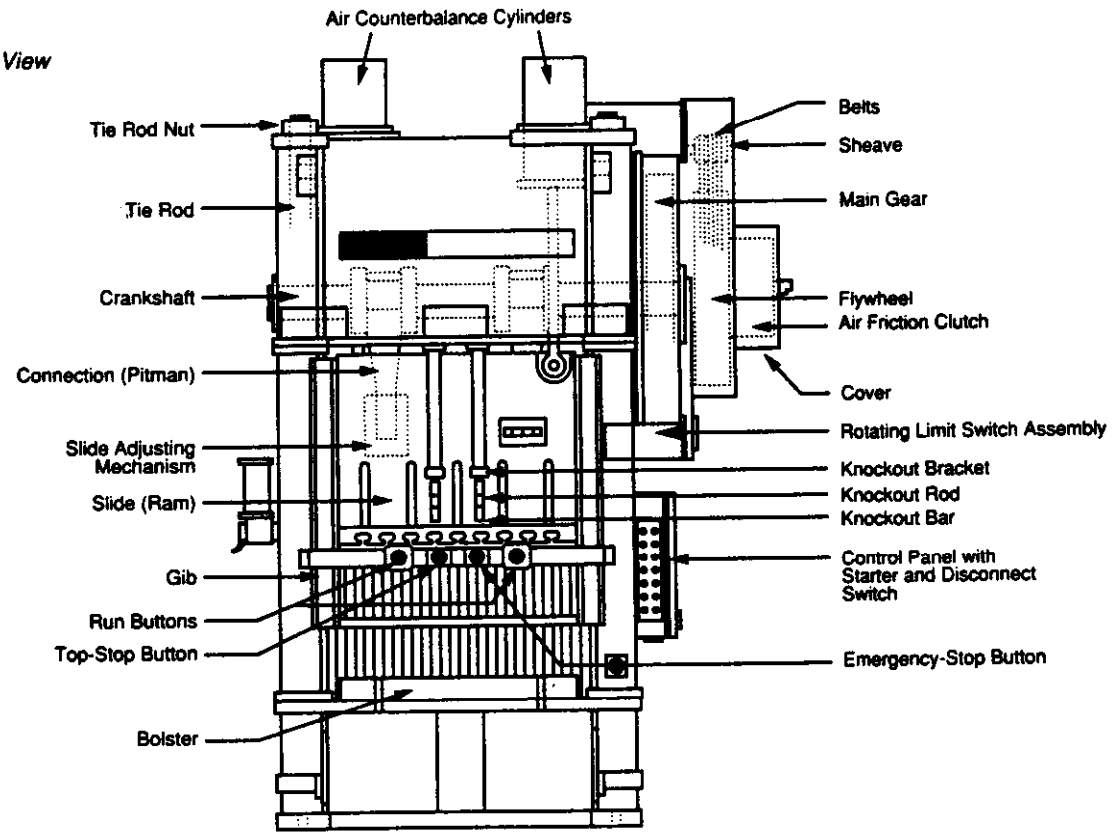
PART REVOLUTION STRAIGHT-SIDE PRESS

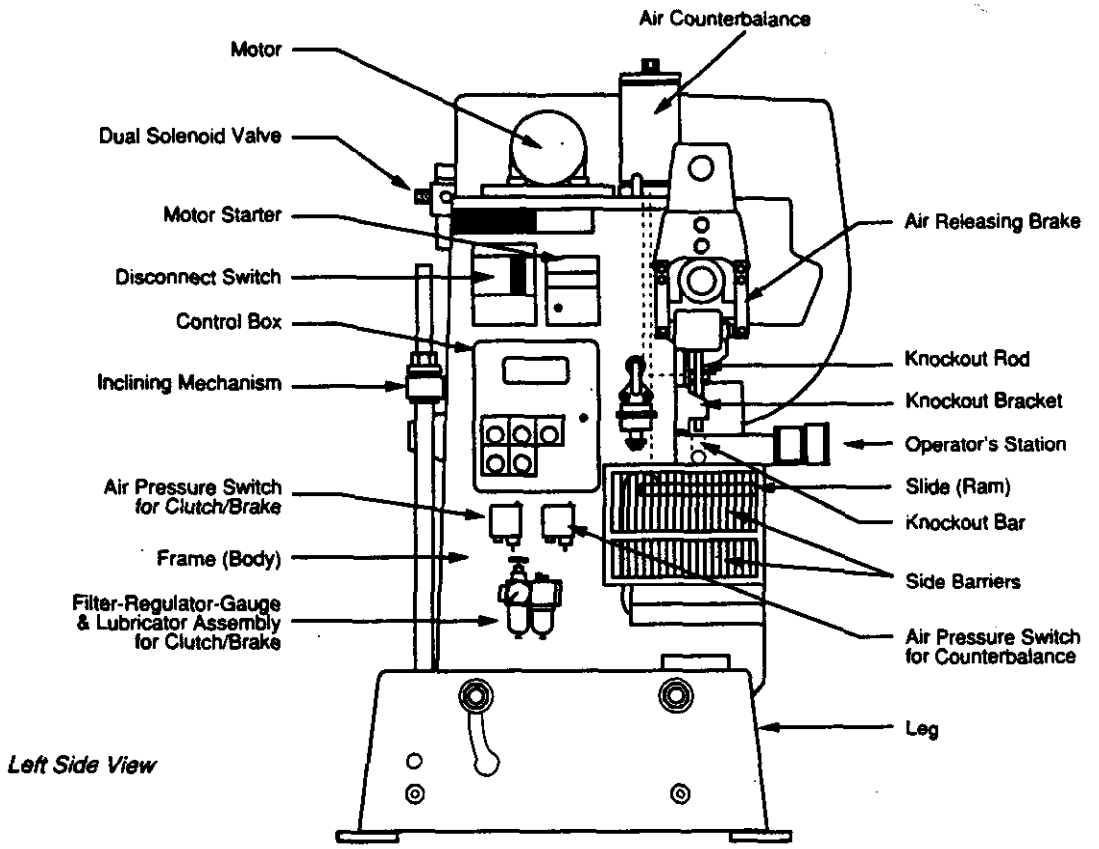
Left Side View



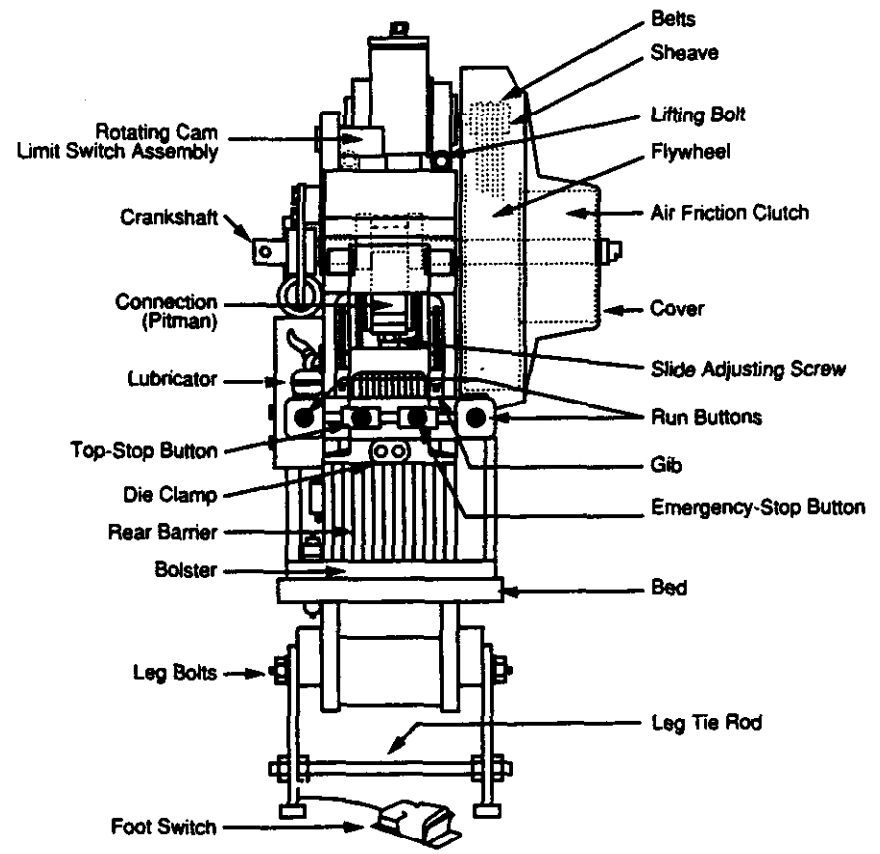
Front View



PART REVOLUTION OBI PRESS

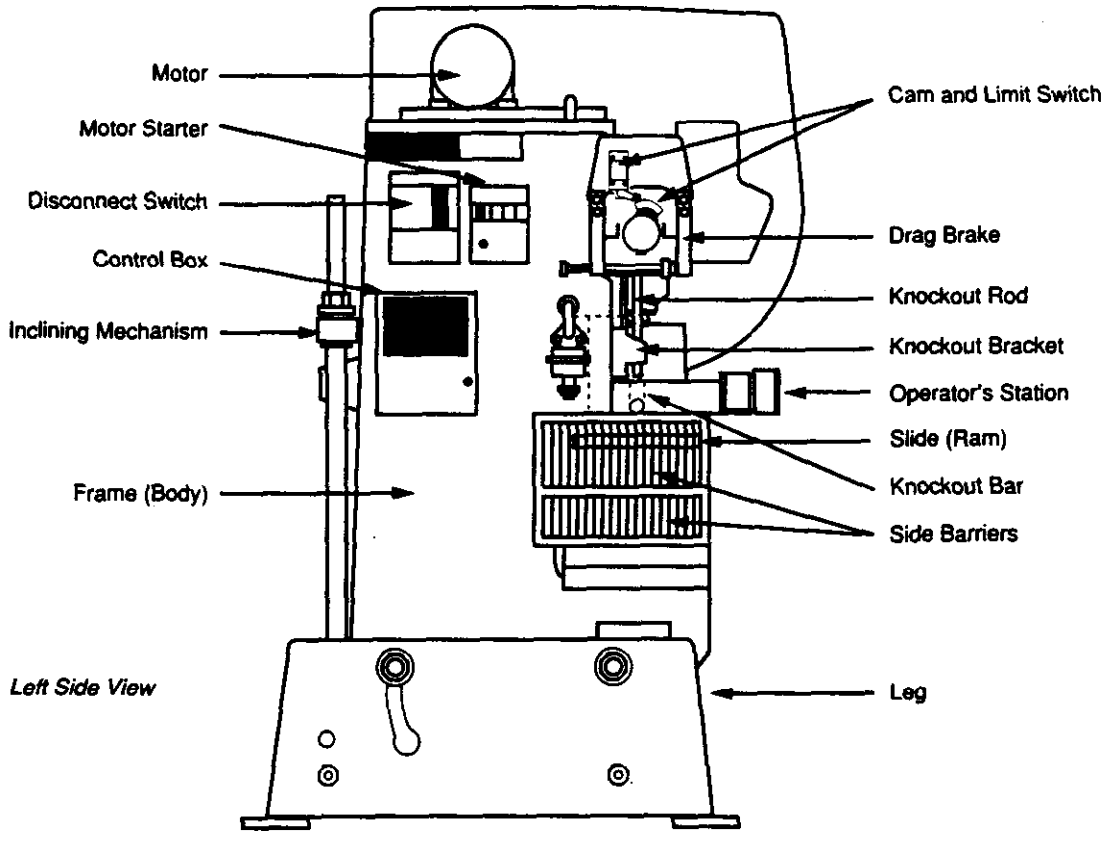


Left Side View

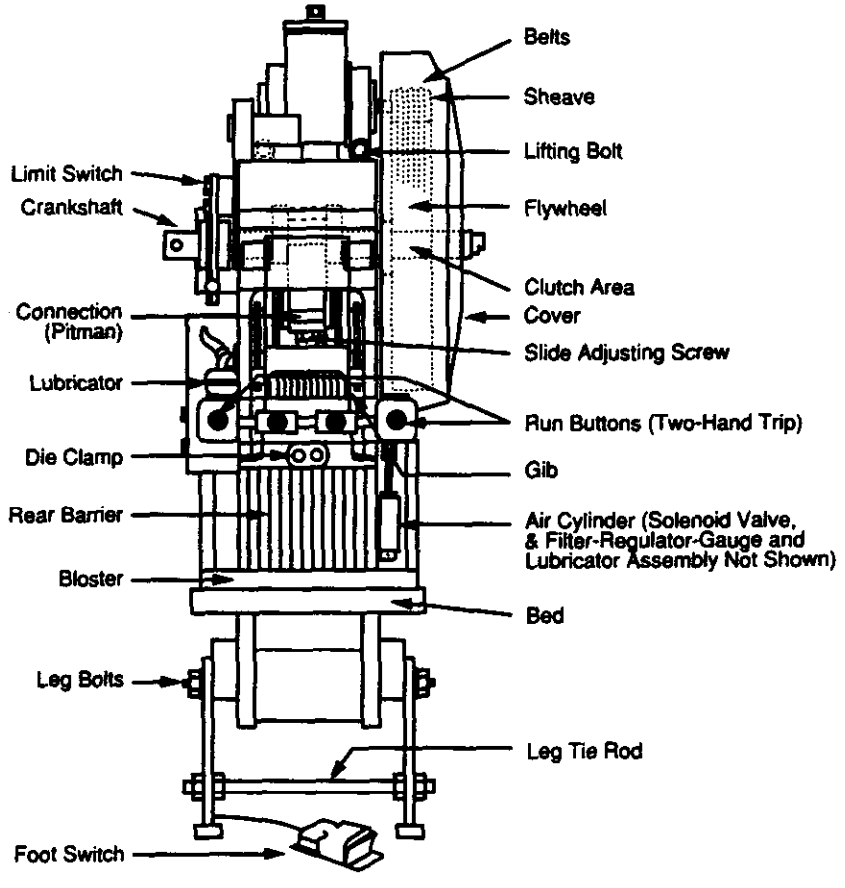


Front View

FULL REVOLUTION OBI PRESS



Left Side View



Front View

POINT-OF-OPERATION SAFEGUARDING MECHANICAL POWER PRESSES

The requirements for point-of-operation safeguarding on mechanical power presses are taken from the Code of Federal Regulations (CFR) (OSHA) Subpart "O," 1910.217 Section (c). OSHA says, "It shall be the responsibility of the employer (user) 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."

They also say, "This requirement shall not apply when the point-of-operation opening is 1/4" or less."

OSHA indicates that for every mechanical power press used in United States industry, operator protection must be provided with a guard or device (safeguard). This protection can also be accomplished using a combination of guards and devices. It also says that if there's a point of operation opening that is 1/4" or less, a guard or device is not required. Because the stroke of a mechanical power press is usually more than 1/4", this does not apply very often. Specially designed guards can be used to feed material on some operations.

When updating a power press, the first and most important question is the selection of the proper safeguard. When safety decisions are being made, this decision may dictate the type or reliability of the clutch/brake control system needed. Once the decision has been made on point-of-operation safeguarding, then other components of the power press can be evaluated for full compliance.

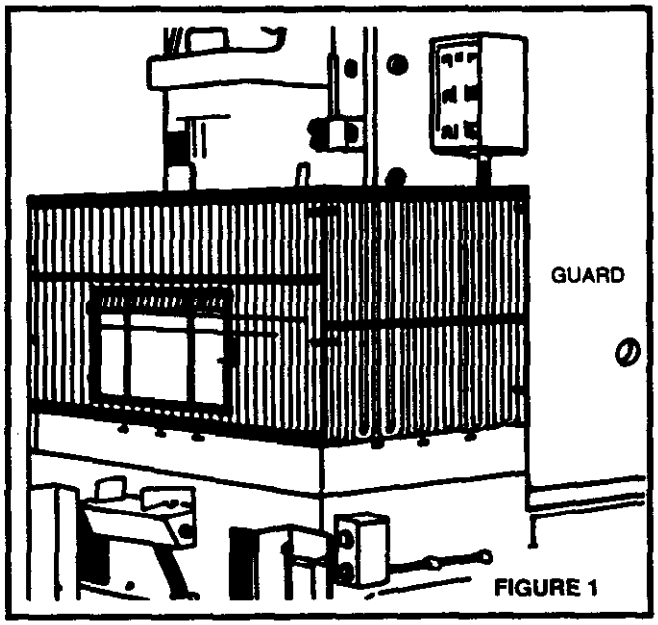


FIGURE 1

I. POINT-OF-OPERATION GUARDS

The first consideration for point-of-operation safeguarding is the feasibility of guards (see Figure 1). OSHA says that, "Each point-of-operation guard shall meet the following design, construction, application and adjustment requirements:

(1) It shall prevent entry of hands or fingers into the point of operation by reaching through, over, under or around the guard."

This is one of the most difficult requirements for a guard. Industries have found in most instances that a guard can be designed and installed to meet this requirement; however, it is very difficult to keep it in this condition. On most presses the guard protects the die area at the perimeter of the bolster. This is done because one press may use many different size dies. Material feeding may be from the front, sides and even from the back of the press. Because of the different size and configuration of dies and the various ways they are fed, diesetters and operators often bend the guards out of shape or even remove portions of the guard so that it no longer complies. When designing and installing any guards, keep in mind the different types of dies and feeding methods that may be used on a press.

"(2) It (the guard) shall conform to the maximum permissible openings of Table O-10." (Table O-10 is illustrated on page 2.)

When reviewing Table O-10, note that the danger line is at the far left end. This is where any pinch point is created in the die, leaderpin and bushing, scrap chopper, or ingoing nip points of a feed. The allowable openings are arranged in a stairstep manner, closely representing the cross-section of fingers, hand and arm. Obviously, as the opening gets larger, the further the guard must be located from the operator's nearest pinch point.

A special guard opening scale can be used for measuring the proper distance; however, a tape measure can also be used. For example, if you need a 1-1/2" opening, the guard location would have to be at least 12-1/2" from the nearest pinch point.

"(3) It shall, in itself, create no pinch point between the guard and moving machine parts."

When designing or installing a guard, the slide (ram) must be considered as it moves up and down. Should there be a protrusion from the slide which will be close to the guard, then a new pinch point may be created between the slide and the guard. There is usually a knockout bar in the slide which may create another pinch point between the bar and the adjustable knockout pins. The bar and pin must also be guarded in accordance with these requirements. To do this, the point-of-

operation guard should be designed and then installed at a point high enough to protect this area; or a roof section can be added.

"(4) It shall utilize fasteners not readily removable by operator, so as to minimize the possibility of misuse or removal of essential parts."

What is a fastener that is not readily removable? Is a wing nut readily removable? Probably so. A fastener which requires the use of some type of tool for removal should be used. This could be as simple as a slotted-head fastener which would allow the use of a screwdriver, or a sockethead, hexhead, torxhead or other special "Tampruf" (tamperproof) type fastener.

"(5) It shall facilitate its inspection."

This means that it should make it easy for someone to inspect the guard for compliance.

"(6) It shall offer maximum visibility to the point of operation consistent with the other requirements."

This means that the operator should be able to look into the point of operation to make sure that the part has been ejected or to see if the material is positioned correctly. This can be accomplished with openings in the guard where the operator needs to look through, being careful to maintain compliance with Table 0-10. Another solution is the use of a product called "Permasite." This is piano wire strung over an aluminum framework with permissible spacing while providing 93% visibility through the protected area. Another possible solution is the use of a polycarbonate material. Two additional reasons for the use of clear polycarbonate material are to protect the operator from the possibility of die parts or pieceparts accidentally being thrown out of the die area, and possibly to cut down on some noise exposure.

Several types of guards can be furnished:

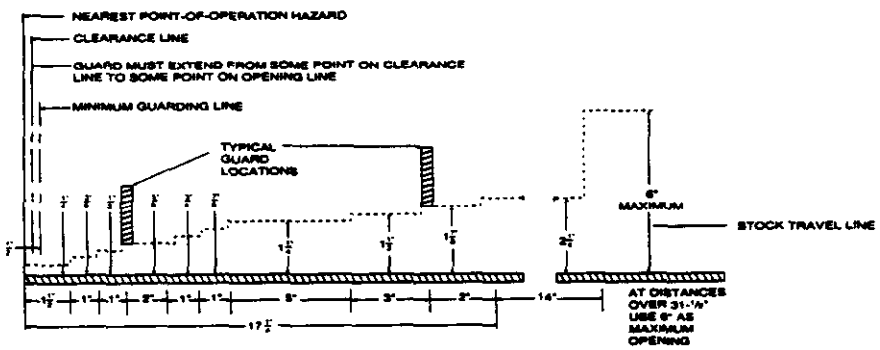
(1) **Die enclosure guard.** OSHA requires that this type of guard be attached to die shoe or stripper in a fixed position. Most industries do not choose this type because they have numerous dies within their plant since each die would require its own guard. This generally impractical and costly, unless the user has very few dies.

(2) **Fixed barrier guard.** The requirement for a fixed guard is that it be attached securely to the frame of the press or to the bolster plate. A fixed barrier is, as the term implies, firmly fixed and must not be adjustable nor have hinged or movable sections.

(3) ***Interlocked press barrier guard.*** *Again, it should be* attached to the press frame or bolster plate. Hinged or movable sections of an interlocked press barrier guard shall be interlocked with the press clutch/brake control so that the clutch cannot be engaged, unless the guard itself or the hinged or movable sections of the guard are in position and conform to the requirements mentioned previously and Table 0-10 for allowable openings.

Guard sections on part revolution clutch presses can be readily interlocked because of the inherent design of the control system. When interlocking barrier guards, keep in mind *that interlocked guard sections must be interfaced with* controls capable of stopping the press mid-cycle. Guard sections on full revolution clutch presses that are operated by a mechanical linkage only, normally cannot be interlocked.

When applying a hinged or movable section of an interlocked press barrier guard, it must not be used for manual feeding. This means that an operator should not manually feed piec



EXPLANATION OF ABOVE DIAGRAM:

This diagram shows the accepted safe openings between the bottom edge of a guard and feed table at various distances from the danger line (point of operation).

The *clearance line* marks the distance required to prevent contact between guard and moving parts.

The *minimum guarding line* is the distance between the infeed side of the guard and the danger line which is one-half inch from the danger line.

The various openings are such that for average-size hands, an operator's fingers won't reach the point of operation.

After installation of point of operation guards and before a job is released for operation, a check should be made to verify that the guard will prevent the operator's hands from reaching the point of operation.

TABLE 0-10

Distance of opening from point of operation hazard (inches)	*Maximum width of opening (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

This table shows the distances that guards shall be positioned fi *the danger line in accordance with the required openings.*

parts through an interlocked guard. When the interlocked guard section is removed or swung out, the press slide must either stop immediately or have already completed the die closing portion of the stroke so that someone cannot reach into the point of operation and become injured. To satisfy this need, the safety distance formulas that apply to two-hand trip, two-hand control and presence sensing devices should be used when designing interlocked barrier guards. An interlocked press barrier guard does not mean that all barrier guards must be interlocked, but when they are interlocked, it must be done in the previously described manner.

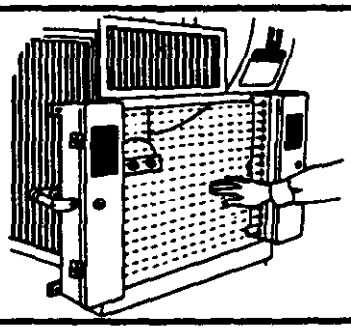
(4) **The adjustable barrier guard.** Again it shall be securely attached to the press bed, bolster plate or die shoe. An adjustable barrier guard can be adjusted for different material widths and thicknesses. When making these adjustments, keep in mind that the operator must not be able to reach through, over, under or around the guard and that it still must meet Table O-10. Adjustments must be made by personnel who have knowledge of the requirements for point-of-operation guarding. This means that diesetters or whoever is responsible for adjusting guards must be trained so they will make adjustments in accordance with the OSHA requirements.

II. POINT-OF-OPERATION DEVICES

If a mechanical power press guard does not meet the requirements, then the guard must be used in conjunction with a safeguarding device. At this time, let's consider point-of-operation devices that could be utilized on power presses. If every effort has been made to apply a guard but it cannot be done because of piecepart size, configuration or production requirements, then a variety of safeguarding devices can be used.

(A) PRESENCE SENSING DEVICES

One of the safeguarding devices that can be used for protection is a "presence sensing device." These devices are normally either photo-electric light curtains (see Figure 2) or RF (radio frequency) sensing field units.



LIGHT CURTAIN PRESENCE SENSING DEVICE

FIGURE 2

Neither type of presence sensing device can be used on full revolution clutch presses, nor can they be used as a tripping means (presence sensing device initiation [P.S.D.I.]).

When applying a presence sensing device to a mechanical power press, it must prevent and/or stop normal stroking of the press if the operators' hands or any part of their body is inadvertently placed in the point of operation. Presence sensing devices must be interfaced to the existing control to provide control reliability and thus, operator protection. This protection is always needed during the downstroke of the press slide because this is when the point-of-operation hazard is usually created.

Presence sensing devices must be designed and constructed for safe operation. Their interface into the clutch/brake system must prevent the initiation of subsequent press strokes should a failure occur. The control failure should be indicated by the system and no further press operation should be possible until the defective component has been either replaced or repaired. Presence sensing devices can be muted (bypassed) on the upstroke to allow for parts ejection, circuit checking or feeding.

The RF-type device uses a capacitance field produced by its control and emitted by an antenna system. With the use of these devices, grounded objects that penetrate the RF field will cause the machine to stop. This device can be installed to protect various shapes. Because the sensitivity can be adjusted, this capability should be behind a lockable door in the RF enclosure so that unauthorized persons are unable to change the adjustment.

The most common presence sensing device is photo-electric, the most common of which is a light curtain which creates a "plane of light." Photo-electric presence sensing devices may use a single light source, multiple light sources, reflectors, or multiple receivers. Infrared light "modulation" is commonly used for additional reliability and to prevent ambient light from affecting their operation.

As with the RF system, a photo-electric presence sensing unit will detect the presence of a hand or other body part in the protected zone causing the machine control to go to a safe condition.

Presence sensing devices must be mounted at the proper "safety distance." The following formula has been established by OSHA:

$D_s = 63 \text{ inches/second} \times T_s$

Where: D_s = minimum safety distance (inches);
63 inches/second = hand speed constant; and
T_s = stopping time of the press measured at approximately 90° position of the crankshaft rotation (seconds).

The only measurement required to apply this formula is the stopping time of the machine at 90° position of crankshaft rotation. This time is usually acquired by the use of a stop-time measurement unit which provides a readout in milliseconds. When using a presence sensing device, keep in mind that point-of-operation access areas not protected by the device must be safeguarded.

A more recent version of this formula is found in ANSI B11.1-1988 entitled "Mechanical Power Presses - Safety Requirements for Construction, Care and Use." This formula takes additional factors into consideration:

$D_s = K \times (T_s + T_c + T_r + T_{bm}) + D_{pf}$

where

K = the hand speed constant = 63 inches per second
T_s = the stop time of the press measured from the final de-energized control element, usually the air valve
T_c = the response time of the press control

NOTE: $T_s + T_c$ are usually measured by a stop-time measuring device

T_r = the response time of the presence-sensing device and its interface, if any, as stated by the manufacturer or measured by the employer

T_{bm} = the additional stopping time allowed by the stopping-performance monitor before it detects stop time deterioration

D_{pf} = the added distance due to the penetration factor. The minimum object sensitivity is stated by the manufacturer. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure.

(B) PULLBACK DEVICE

Another safeguarding device is a pullback (pullout [see Figure 3]). This device is designed to either prevent the operator from ever reaching into the point of operation, or if the hands inadvertently go into this area, to pull them out before the dies close. Specific requirements include the need for attachments (wristlets) for each of the operator's hands. These are usually made of nylon material and are attached to the pulling cables by a snap assembly.

The pullout device must pull back on the wristlets by mechanical ties to either the press slide or upper die. Wristlets must be adjusted so that if the hands are in the point-of-operation area as the dies close, they will be pulled back to a safe position. Most pullback devices have a cam ratio between inches of pull on the wristlets and inches of motion of the slide. For example, if the

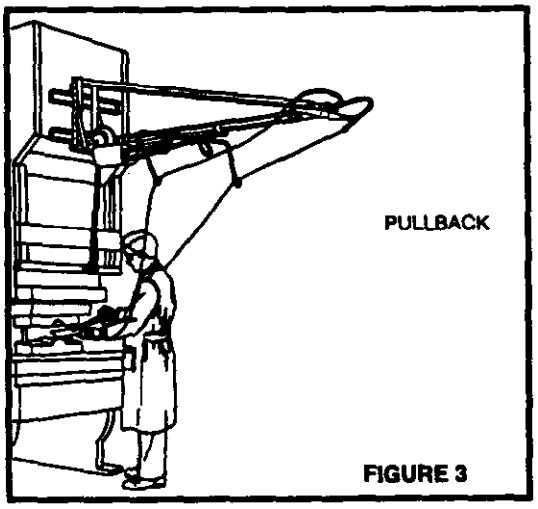


FIGURE 3

pullback has a 7 to 1 ratio, then for every inch the slide travels, the pullback pulls 7".

If a press has more than one operator, each operator must have his own pullback. Another requirement for pullbacks is that they must be inspected and checked for proper adjustment at 1) the start of each operator shift, 2) following a new die set-up, and 3) when operators are changed. If any maintenance or repair is required, it must be done before the press is operated. Records of inspection must also be kept in accordance with OSHA's paragraph (e) (periodic and regular inspections).

(C) SWEEP DEVICES

Another device that was formerly acceptable as a safeguard, was a mechanical sweep; however, as of December 31, 1976, sweeps are no longer acceptable as a primary point-of-operation safeguarding device.

(D) TYPE "A" OR "B" GATE DEVICES

Another safeguarding device is a gate (movable barrier device [see Figure 4]). Gates come in two types: "A" Type and "B" Type. An "A"-Type Gate must enclose the point of operation before the press stroke can be

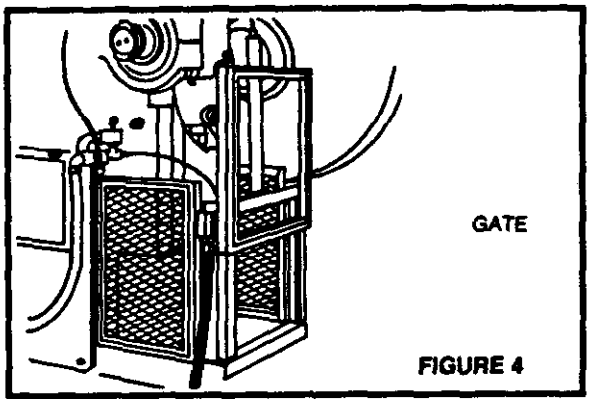


FIGURE 4

started, and must maintain the closed position until all slide motion has stopped. An easy way to remember an "A"-Type Gate is to think of "A" for "after." A typical sequence of operation of a power press using an "A" gate would be: initiate the cycle; the gate comes down (usually by gravity), nothing prevents it from closing such as a hand or piecepart, then the press starts its cycle, makes one full stroke, goes back to the top-dead-center position of crankshaft rotation and stops. The gate will then open, after the stroke has stopped ("A" for after).

A "B"-Type Gate is only required to protect the operator on the downstroke of the press slide. An easy way to remember a "B"-Type Gate is to think of "B" for "before." The sequence of a "B"-Type Gate would be: Initiate the cycle; the gate comes down; nothing interrupts its movement, then the press cycle is initiated and the slide starts its stroke. Once the slide gets to the portion of the stroke where the pinch point has been eliminated, the "B"-Type Gate and the slide go up at the same time (the gate opens before ("B") the cycle is complete).

According to OSHA, an "A" gate could be used on either part or full revolution clutch presses. Good safety practice is that the "B"-Type Gate should only be used on part revolution clutch presses.

(E) RESTRAINT DEVICE

Another safeguarding device is a restraint (holdout [see Figure 5]). When furnishing this type of device, wristlets must be provided for each operator. Wristlets and cables must be attached or anchored so that an operator is unable to reach into the point-of-operation

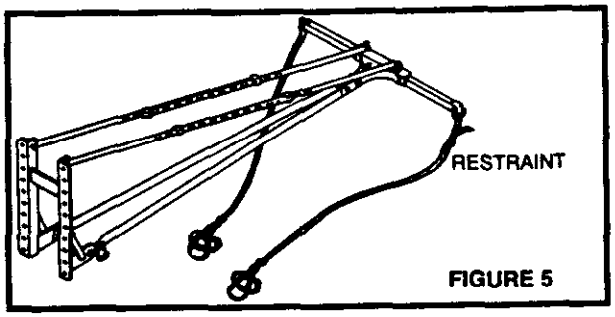


FIGURE 5

hazard area at any time. To use this type of device, the piecepart has to be long enough to hold onto one end while stamping the other end, or the operator must use a hand-feeding tool.

(F) TWO-HAND CONTROL AND TWO-HAND TRIP

Two other safeguarding devices that can be used are either two-hand control or two-hand trip (see Figure 6). To qualify as a safeguarding device, they must be located at a sufficient safety distance so that the slide has traveled far enough on the downstroke, or can stop fast enough to prevent the operator from getting into the point-of-operation hazard should he release the buttons.

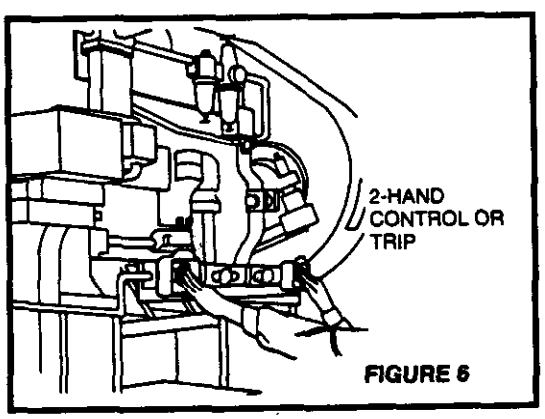


FIGURE 6

Two-hand controls can only be used on part revolution clutch presses. The palm buttons must be protected from unintentional operation and arranged by design, construction and/or separation so that the operator must concurrently depress both buttons. Two-hand controls must have an antirepeat feature. This part of the control system limits the press to one stroke if the palm buttons are held down throughout the entire stroke while in the single stroke mode of operation. Antirepeat also requires that all buttons be released before another stroke can be initiated. If more than one operator is required, each operator must have his own set of palm buttons. The palm buttons must also be arranged so that the operator must hold them down through the die closing portion of the stroke. This is sometimes called "holding time." All operators must be protected when there's an interrupted stroke. This means that if any operator should release a palm button during the downstroke, then all buttons must be released and reinitiated before the interrupted stroke can be resumed. When applying two-hand controls to a power press, the palm buttons must be located at a minimum safety distance as explained earlier in the presence sensing section.

Before calculating the safety distance, the stopping time of the press must be determined. This is measured by interrupting a press cycle at the 90° position of crankshaft rotation. To accomplish this, a stop-time measuring unit is used. These units can be portable or built into the control system. Both types provide a readout in milliseconds or inches. If the longest stopping time is 230 milliseconds, the formula would be calculated as follows:

D_m= 63 inches/second x.230 seconds=14.49 or 14-1/2"

The calculation is quite simple; however, for quick, easy reference, the following chart shows maximum time for each 1/2" of safety distance.

Ts	Ds
.095	6"
.103	6-1/2"
.111	7"
.119	7-1/2"
.126	8"
.134	8-1/2"
.142	9"
.150	9-1/2"
.158	10"
.166	10-1/2"
.174	11"
.182	11-1/2"
.190	12"
.198	12-1/2"

Ts	Ds
.206	13"
.214	13-1/2"
.222	14"
.230	14-1/2"
.238	15"
.246	15-1/2"
.253	16"
.261	16-1/2"
.269	17"
.277	17-1/2"
.285	18"
.293	18-1/2"
.301	19"
.309	19-1/2"

ANSI B11.1 - 1988 explains that "safety distance" calculations should take additional factors into consideration. It also suggests that separate "safety distance" formulas should be used, one for two-hand control and another for presence sensing devices. For two-hand control, the B11.1 - 1988 explains that the total stopping time of the press should include the total response time of the control system and the time it takes the press to cease slide motion. They suggest that the following formula should be used when calculating the safety distance:

$D_s = K (T_s + T_c + T_{bm})$

where

- K = the hand speed constant = 63 inches per second.
- T_s = the stop time of the press measured from the final de-energized control element, usually the air valve.
- T_c = the response time of the control.

NOTE: $T_s + T_c$ are usually measured by a stop-time measuring device.

- T_{bm} = The additional time allowed by the brake monitor before it detects stop-time deterioration.

When the press stroke STOP command or stopping-performance monitor timer setting is changed, the safety distance should be recalculated.

Also the palm buttons must be fixed either to the machine or to the floor once the safety distance has been determined so that only a supervisor or a safety engineer has the ability to relocate the buttons.

Although brake deterioration is the number one concern, other factors could cause the press not to stop normally. These include air line restriction, hose crimping, air pressure variance for clutch/brake, counterbalance, air pressure, dirty muffler, variance in press speed, undersized solenoid valve, and die weight. On numerous occasions, users have found that the solenoid valves they were using on large (250 ton or larger) presses were too small. By installing a larger capacity valve and larger piping and hoses, they were able to considerably decrease stopping time. Faster stopping times can also be acquired by properly maintaining the clutch and brake, and by using two valves on presses that have the clutch and brake in a split application.

The 90° position of the crankshaft is used to check stopping time, because at that point, the slide of a mechanical press moves downward at maximum speed. In this position, the stopping time is usually at its maximum because of the inertia of the slide and tooling. A consideration when testing the press for stopping ability should be the temperature of the brake. Is it hot or cold? Either condition may cause variance in stopping ability. Maximum stopping time conditions should always be used to determine safety distance.

Many things have to be kept in mind when testing the press. We suggest that the worst (or longest) time be used for calculating the safety distance, since this will always provide the safest condition.

Having established the safety distance, the two-hand control or presence sensing device (light curtain or radio-frequency) can be mounted on the press. When mounting any of these devices, please keep in mind that sides and back of the die area must also be safeguarded.

OSHA regulations also state that on part revolution clutch presses, when using a two-hand control, presence sensing device, or Type "B" gate with hands in die (HID) feeding, that the press control comply with paragraphs (b)(13) control reliability and (b)(14) brake monitoring.

Two-hand trip can be used on both full and part revolution clutch presses. The palm buttons must be constructed and arranged the same as for two-hand control so that the operator must use both hands to trip the press. If more than one operator is operating a press, each operator must have his own set of palm buttons to trip the press.

Two-hand trip requires only a momentary action of the hands on the run buttons. Once the run buttons have been concurrently depressed, they can be released quickly and the machine will make a complete cycle. Both two-hand control and trip require that the buttons be depressed concurrently. Most of the new controls that are available for updating power presses have an adjustable time to concurrently depress both buttons. If both buttons are not depressed within the time limit, they must both be released and reinitiated. To control this time, an adjustable potentiometer can be used which should be located within a locked enclosure to prevent unauthorized adjustment.

The formula for two-hand trip is different than the previously mentioned formula for two-hand control and presence sensing devices. The formula for two-hand trip is as follows:

$$D_m = 63 \text{ inches/second} \times T_m$$

Where: D_m = minimum safety distance (inches);
63 inches/second = hand speed constant;
and
T_m = the maximum time the press may take for die closure after it has been tripped (seconds).

For a full revolution press with only one engagement point, T_m is equal to the time necessary for one and one-half revolutions of the crankshaft. For presses that have more than one engagement point, the following formula is used:

$$T_m = \left[\frac{1}{2} + \frac{1}{\text{Number of engaging points per revolution}}\right] \times \text{Time necessary to complete one revolution of the crankshaft (seconds).}$$

To calculate the safety distance for two-hand trip on full revolution clutch presses, the strokes per minute and number of engagement points are needed.

The requirement that the palm buttons be fixed in position is the same as for two-hand control.

OSHA also explains that hand-feeding tools cannot be used as a primary point-of-operation safeguarding device. They can be used as a secondary means of protection in conjunction with any of the previously described safeguarding devices.

POWER PRESS SAFEGUARDING SUMMARY

This summary compares inspection requirements, brake monitoring and control reliability requirements, safety distances, and acceptable and unacceptable arrangements. The summary does not include detailed specifications, requirements for multiple operators, and other details too numerous to include in this summary. For details see OSHA standard 1910.217 or send for a free copy of "Mechanical Power Presses and OSHA".

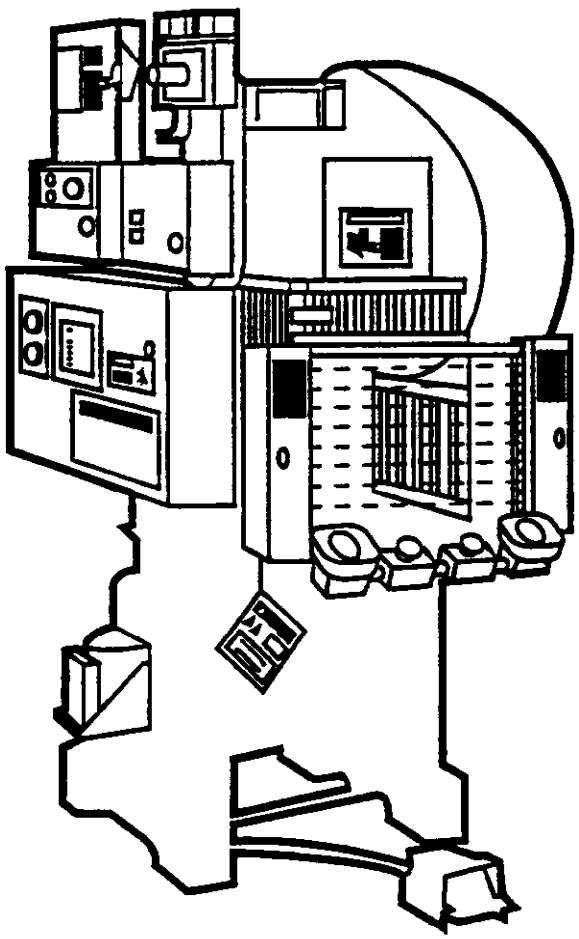
GUARD TYPE OR DEVICE	FULL REVOLUTION		PART REVOLUTION	
	HANDS IN	HANDS OUT	HANDS IN	HANDS OUT
GUARDS				
BARRIER GUARDS (Fixed, Adjustable, Die Enclosure)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (2) (i) (a)	YES INSPECT WEEKLY SEE 217 (e) (1) (i) & (e)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (2) (i) (a)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
INTERLOCKED BARRIER GUARD	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (2) (v)	YES INSPECT WEEKLY SEE 217 (e) (1) (i) & (e)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (2) (v)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
MOVEABLE BARRIER GUARDS				
TYPE A GATE	YES INSPECT WEEKLY SEE 217 (e) (1) (i) & (e)	YES INSPECT WEEKLY SEE 217 (e) (1) (i) & (e)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
TYPE B GATE	NO FORBIDDEN** SEE 217 (c) (3) (i)*	NO FORBIDDEN** SEE 217 (c) (3) (i)*	YES BRAKE MONITOR & CONTROL SYSTEM 217 (c) (5) MUST DETECT TOP-STOP OVERRUN BEYOND LIMITS 217 (b) (14) (i)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
DEVICES				
PRESENCE SENSING	NO FORBIDDEN SEE 217 (c) (3) (ii) (a)	NO FORBIDDEN SEE 217 (c) (3) (ii) (a)	YES SAFETY DISTANCE 217 (c) (3) (ii) (a) & BRAKE MONITOR & CONTROL RELIABILITY 217 (c) (5)	YES SAFETY DISTANCE 217 (c) (3) (ii) (a) & INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
PULL-OUT	YES INSPECT... EACH SHIFT EACH DIE SET-UP EACH OPERATOR SEE 217 (c) (3) (iv) (d)	YES INSPECT... EACH SHIFT EACH DIE SET-UP EACH OPERATOR SEE 217 (c) (3) (iv) (d)	YES INSPECT... EACH SHIFT EACH DIE SET-UP EACH OPERATOR SEE 217 (c) (3) (iv) (d)	YES INSPECT... EACH SHIFT EACH DIE SET-UP EACH OPERATOR SEE 217 (c) (3) (iv) (d)
SWEEP	NO UNACCEPTABLE SAFEGUARD AFTER DEC. 31, 1976 SEE 217 (c) (3) (v) ALSO SEE 217 (e) (1) (i) & (e)	NO UNACCEPTABLE SAFEGUARD AFTER DEC. 31, 1976 SEE 217 (c) (3) (v) ALSO SEE 217 (e) (1) (i) & (e)	NO UNACCEPTABLE SAFEGUARD AFTER DEC. 31, 1976 SEE 217 (c) (3) (v) ALSO SEE 217 (e) (1) (i) & (e)	NO UNACCEPTABLE SAFEGUARD AFTER DEC. 31, 1976 SEE 217 (c) (3) (v) ALSO SEE 217 (e) (1) (i) & (e)
HOLD-OUT (RESTRAINT)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (3) (vi)	YES INSPECT WEEKLY SEE 217 (e) (1) (i) & (e)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (c) (3) (vi)	YES INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)
TWO-HAND CONTROL	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (b) (7) (b) & 217 (c) (3) (vii)	NO (IMPOSSIBLE BY DEFINITION) SEE 217 (b) (7) (b) & 217 (c) (3) (vii)	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED CONTROL POSITION 217 (c) (3) (vii) (d) & BRAKE MONITOR & CONTROL RELIABILITY 217 (c) (5)	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED CONTROL POSITION 217 (c) (3) (vii) (d) AND SEE ALSO 217 (e) (1) (i) & (e)
TWO-HAND TRIP	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED TRIP POSITION 217 (c) (3) (vii) (d) & INSPECT WEEKLY 217 (e) (1) (i) & (e)	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED TRIP POSITION 217 (c) (3) (vii) (d) & INSPECT WEEKLY 217 (e) (1) (i) & (e)	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED TRIP POSITION 217 (c) (3) (vii) (d) & INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)	YES SAFETY DISTANCE 217 (c) (3) (vii) (c) & FIXED TRIP POSITION 217 (c) (3) (vii) (d) & INSPECT WEEKLY 217 (e) (1) (i) & (e) OR *BRAKE MONITOR & CONTROL RELIABILITY 217 (b) (13) & (14)

*The application of brake monitoring (only), is optional in these instances. ** Interpretation

NOTE: BOTH CONTROL RELIABILITY AND BRAKE MONITORING ARE REQUIRED WHEN A "HANDS IN DIE" FEEDING OPERATION EXISTS. ("H.I.D." FEEDING IS WHENEVER THE OPERATOR IS EXPOSED TO A POINT OF OPERATION HAZARD)

Mechanical Power Presses Safety

Evaluation Checklist



MECHANICAL POWER PRESSES SAFETY EVALUATION CHECKLIST

SECTION I

PRESS CONSTRUCTION REQUIREMENTS

	YES	NO
A. Inherent hazards (other than point of operation) Are other hazards protected such as: 1. Flywheels, gears, sheaves & shafts? Run-in pinch points such as rolls, belts and chains? 2. Are there pinch points between slide and stationary components of press?		
B. Hazards from broken or falling press components such as flywheels, gears, motors, clutches, springs, etc?		
C. Does press have friction brake with compression springs?		
D. *Electrical requirements* 1. Does press have main power disconnect capable of being locked "off". 2. Does press have motor starter with start button protected and does the starter dropout in event of voltage or power-source failure? 3. Are all AC control circuits 120 volts or less obtained through a transformer? 4. Is clutch/brake control protected against false operation (grounding)?		
E. Counterbalance requirements 1. If it is spring type, is spring retained and capable of holding slide at midstroke? 2. If it is air type, is it capable of holding the slide at any position of stroke and protected from sudden air loss? 3. If air type, is air supply monitored?		
F. Is air system clean (and lubricated, when needed)?		
G. Do all air pressure vessels meet appropriate standards?		
H. Does hydraulic system (if provided) operate within ratings?		
I. Die clamping system 1. Hold upper and lower dies adequately during stroke? 2. Is pressure monitored and is it tied into control?		

	YES	NO
J. Do the press clutch/brake controls have the necessary reliability so that a single failure or fault will stop the press when signal is given? 1. Does control prevent successive stroke after failure? 2. Does control prevent unintended stroke?		
K. Brake monitor (stopping performance monitor) If required, does it: 1. Prevent another stroke if press exceeds predetermined limit? 2. Have control reliability? 3. Monitor each stroke? 4. Have its adjustment supervised?		

SECTION II

FULL REVOLUTION

	YES	NO
A. If press is single stroked, does it have single stroke capability?		
B. Are single stroke springs: 1. Compression type? 2. Guided in hole, tube, or on rod? 3. Protected from interleaving?		
C. Trip Mechanisms (if provided) 1. Foot pedal a. Non-slip contact surface? b. Have same type of springs as for single stroke? c. Protected from unintended actuation? d. If counterweights furnished, are they enclosed? 2. Hand Levers (if provided) a. Have spring latch to prevent premature or accidental tripping? b. If more than one lever, arranged for concurrent use?		

(continued)

	YES Comments	NO Comments
D. Trip Control Systems		
1. Stroking Selector (if needed)		
a. Does press have off, single stroke, continuous, maintained continuous?		
b. Is it capable of being supervised?		
2. Jog (if furnished): Is it arranged to require use of both hands or, if single control, protected from accidental actuation and located so operator can not reach point of operation?		
3. Single Stroke (same as single stroke capability in Item II, A.) Does it have antirepeat?		
4. Continuous Does control have prior action before continous?		
5. Maintained Continuous Does control have prior action before maintained continuous?		
6. Other Modes *If full revolution press has* continuous-on-demand or automatic single stroke, see part revolution requirements.		
7. Hand/Foot Is selector separate from stroking selector?		
8. Two-Hand Trip (not safeguard) Do they require concurrent use of both hands?		
9. One-Hand Trip Protected against inadvertent actuation?		
10. Foot Trip Protected against falling objects or inadvertent stepping on trip control?		
11. Multiple Operator Stations		
a. Arranged for turning on & off each station?		
b. Supervised?		
c. Press will not activate if all stations are by-passed?		
12. Air Valve (if furnished) Is it *dual and monitored?*		
13. Motor Interlock (if reversing starter is furnished) Does press operate only in jog mode when in reverse?		

SECTION III

PART REVOLUTION

	YES Comments	NO Comments
A. If springs are used to stop press, are they compression type, guided in hole or tube or on rod and protected from interleaving?		
B. Controls		
1. Stop Control Is it red in color, immediately stop press, overide any other control and require reactuation of actuating means?		
2. Top Stop If furnished, is it yellow?		
3. Stroking Selector		
a. If required, does press have off, inch, single stroke, continuous or maintained continuous?		
b. Is selector supervised?		
4. Operating Modes		
a. Does press control have an off position?		
b. Inch must not be used for *operating mode. Requires* use of both hands, or if single control, must be protected and located so operator cannot reach point of operation.		
c. Single Stroke		
1. Does press have single stroke capability?		
2. *Is actuating means* arranged so that operator must concurrently hold operated during hazardous portion of stroke?		
3. Does it have antirepeat?		
4. If press stroke is interrupted, does operator have to release all actuating means and reactuate to finish stroke?		
5. *Are multiple operator* stations arranged for turning on & off each station?		
6. Supervised?		
7. Press will not activate if all stations by-passed.		
d. Continuous Does it have a prior action *before continuous* stroking?		
e. Maintained Continuous Does it have a prior action before continous stroking?		

(continued)

	YES	NO
t. Continuous-on-Demand 1. Supervised selection? 2. Does it have a prior action before stroke? 3. Does it have timer to prevent actuation or reactuation if predetermined time is exceeded? 4. When any stop control is actuated, does press require a timed prior action before stroking again?		
g. Automatic Single Stroke 1. Supervised selection? 2. Does it have a prior action before stroke? 3. Does it have timer to prevent actuation or reactuation, if predetermined time is exceeded? 4. After stop signal, does it require prior action?		
h. Hand/Foot Is Hand/foot selector separate from stroking selector?		
i. Two-Hand Control Are they protected from unintended actuation and require use of both hands?		
j. One Hand Control Is it protected from unintended actuation, and if both one-hand and two-hand are provided, is selection supervised?		
k. Foot Control Is foot control protected against falling objects or inadvertent stepping on foot control?		
l. Air Valve 1. Is it dual and monitored? 2. Is exhaust muffler kept clean?		
m. Motor Interlock (if reversing starter is furnished) Does press operate only in inch mode when in reverse?		
n. Clutch/Brake Power Supply Does press automatically stop in event of: 1. Electrical failure (magnetic starter)? 2. Air failure (air pressure switch)?		
o. Turnover Bar Operation (if furnished) 1. Is it supervised? 2. Does it have separate push button?		
p. Data Plate Does press have clutch air pressure data on plate near regulator?		

SECTION IV

SAFEGUARDING

	YES	NO
A. Exception to safeguarding is when the hazardous opening is 1/4" or less.		
B. Guards 1. Does guard meet the following design, construction, application and adjustment requirements: a. Can someone reach through, over, under, or around guard? (See Figure 1 and Table 1). b. Is there a pinch point between the guard and moving parts? c. Is there adequate visibility through guard? d. Does guard have fasteners that are not readily removable? e. Are guard materials adequate? 2. Die Enclosure Guard Is it attached to die in fixed position and meet previous requirements? 3. Fixed Guard Is it attached to press and meet previous requirements? 4. Adjustable Guard a. Is it attached to press and meet previous requirements? b. Does person authorized to adjust guard understand requirements?		

Figure 1 Positioning of Guards

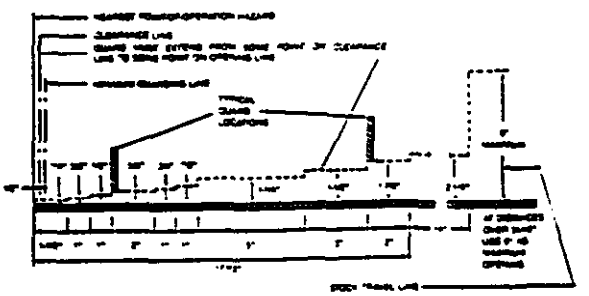


Figure 1 shows the accepted safe openings at various distances from the nearest point of operation hazard. The clearance line marks the distance required to prevent contact between guard and moving parts. The minimum guarding line is the distance between the infeed side of the guard and the nearest point of operation which is 1/2 inch from the nearest point of operation hazard.

(continued)

TABLE 1 Recommended Maximum Openings

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

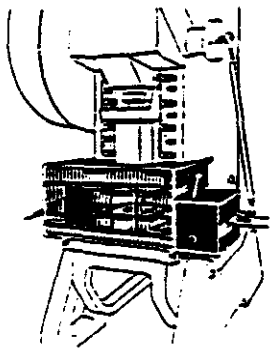
TABLE 1 shows the distances that guards should be positioned from the nearest point of operation hazard.

The various openings are such that for an average size hand (size 6 womens), operator's fingers will not reach the point of operation.

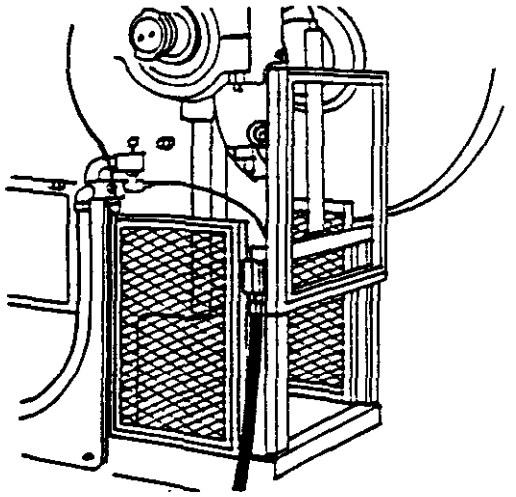
After installation of point of operation guards, and before a job is released for operation, a check should be made to verify that the guard will prevent the operator's hands or other body parts from reaching the point of operation.

	YES	NO
5. Interlocked Guard (if used)		
a. Is it attached to press and meet previous requirements?		
b. Prevent stroke if opened?		
c. Stop stroke during cycle?		
d. Does press start its stroke when interlocked section is closed? (Should not do this).		
e. Is operator manually feeding through guard? (Should not be able to do this).		
f. Is interlocked guard arranged so someone cannot reach point of operation when opening the guard and reaching through before slide has either stopped or completed downward travel?		

Guard



"A" or "B" Type Gates



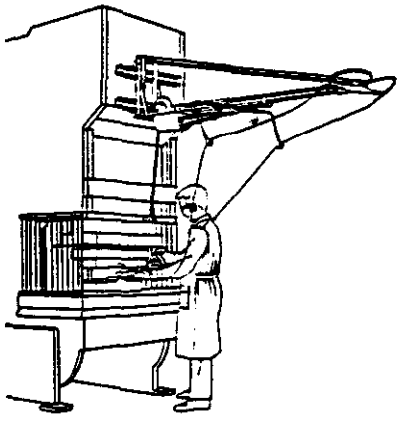
	YES	NO
C. Devices		
1. Gate or Movable Barrier Devices Is it designed and constructed so that:		
a. Returns to open position when gate hits obstruction?		
b. Provide adequate visibility?		
c. When gate is in closed position, can someone reach over, under, around, or through?		
d. Does gate control have reliability?		
e. Does gate create hazard?		
f. Type "A" gate (when in single stroke), does it:		
1. Close off access before stroke?		
2. Trip press when closed?		
3. Arranged so that it won't open until cycle has stopped at top of stroke?		
4. Reset anti-repeat before another stroke?		
g. Type "B" gate (cannot be used on full revolution). When in single stroke, does it:		
1. Close off access before stroke?		
2. Trip press when closed?		
3. Arranged so that it doesn't open until press has at least made downstroke?		
4. Reset anti-repeat before another stroke?		
5. Have brake monitoring?		

(continued)

YES Comments	NO Comments

2. Presence sensing devices (part revolution only)
   a. Does it prevent stroke or stop stroke during downward travel?
   b. After field is clear, is hand or foot actuating means required to trip press?
   c. Is proper muting provided (only during non-hazardous part of stroke)?
   d. Is minimum object sensitivity indicated?
   e. Has maximum response time been considered in safety distance?
   f. Are channel blanking or floating window adjustments capable of being supervised and not abused?
   g. If area is blanked out, is there an indication of how much is blanked?
   h. If device arranged to be by-passed, is there an indication when this is done?
   i. Is device affected by other reflective objects or workpieces?
   j. Does device, control system and interface have control reliability?
   k. Is device adversely affected by changing conditions around press?
   l. Is device at proper safety distance according to formula?
   m. Is device affected by ambient light?
   n. Are all areas not protected by presence device properly guarded?
   o. Is press equipped with brake monitoring?

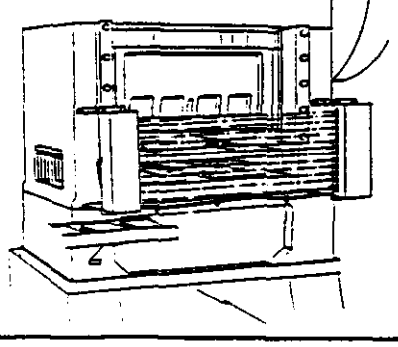
Pullback



YES Comments	NO Comments

3. Pullbacks
   a. Withdraw hands as die closes?
   b. Is device operated by slide or upper die?
   c. Is device visually inspected and checked every shift, after die set-up and when operators are changed?
   d. Are proper fasteners used?
   e. Are wristlets in good condition?
   f. Can wristlets hang-up on anything in the die area?
   g. If gloves are worn, are wristlets worn inside gloves?
   h. If more than one operator, does each have their own pullback?

Presence Sensing Device

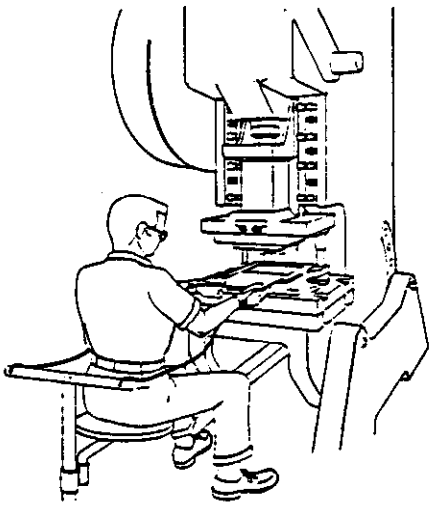


(continued)

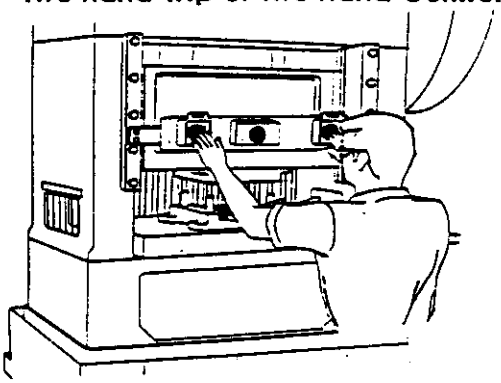
4. Restraints
   a. Prevent operator from reaching hazard?
   b. Are fasteners used and applied correctly?
   c. Are cables, straps, wristlets of substantial materials?
   d. If more than one operator, does each have their own restraint?

YES Comments	NO Comments

Restraint



Two-Hand Trip or Two-Hand Control



5. Two-Hand Control (part revolution only)
   a. Are they protected from unintended operation?
   b. Are they arranged to require use of both hands?
   c. Are they arranged for concurrent operation? (Timer is not required).
   d. Are they at proper safety distance according to formula?
   e. For additional requirements, see Part Revolution Section III, B.4.c.
   f. Does the control have control reliability?
   g. Does press have brake monitor?

YES Comments	NO Comments

6. Two-Hand Trip
   a. Are they protected from unintended operation?
   b. Are they arranged to require use of both hands?
   c. Are they arranged for concurrent operation? (Timer is not required).
   d. Are they at proper safety distance according to formula?
   e. Do they have anti-repeat?
   f. For multiple operators, do they all meet previous requirements?
   g. Does the control have control reliability?
   h. If used on part revolution, does press have brake monitor?
7. Safe Opening
   a. With workpiece in position in die, can operator reach into point of operation?
   b. Is press arranged so that it will not stroke unless piecepart is in position?

YES Comments	NO Comments

SECTION V

DESIGN, CONSTRUCTION, SETTING AND TRYOUT OF DIES

YES	NO

A. Design and Construction
Are dies arranged for ease in die setting and handling?

B. Die Setting
1. Does the die setter know tonnage requirements of die?
2. Do they know upper die weight for setting counterbalance?

C. Die Fastening
When punch stems are used, are there other means of fastening die to slide other than the clamp cap?

D. Die Setting Procedures
Does employer have a die setting procedure?

E. Die Setter Training
Are all die setters trained in the proper procedures?

F. Turnover Bar (if used)
Is turnover bar arranged so that it must be removed from barring hole?

G. Die Stops
If press is inclined, are die stops provided?

H. Die Adjustments, Cleaning or Repair
Whenever employees need to place their hands or other body parts in die:
1. Is main drive motor off and clutch/brake control system deactivated?
2. Are safety blocks used to support die and slide?

I. Die Tryout
Are the personnel trying-out die properly safeguarded?

SECTION VI

OPERATION OF PRESS PRODUCTION SYSTEMS

YES	NO

A. Design of System
1. Has employer established a press production system that is properly designed and applied?
2. In this system, are safeguards properly used?

B. Instructions to Operators
Have operators been properly instructed before starting work on power press and can they demonstrate their knowledge?

YES	NO

C. Work Area
Is the press room housekeeping kept in good condition so that hazards have been eliminated?

D. Hand Feeding Tools
Hand feeding and retrieval tools can be used, however they cannot be considered point of operation safeguards.

E. Removal of Material
Are hand tools used for freeing and removing stuck work or scrap pieces from die?

F. Lubrication of Material, Punches or Dies
Is equipment provided to lubricate material and dies so employees do not have to reach in the point of operation for this purpose?

G. Press Tonnage Ratings
Are presses used to operate within tonnage ratings, die weight, shut height and die-area space as specified by press manufacturer?

SECTION VII

CARE - RESPONSIBILITY

YES	NO

Instructions

A. Manufacturer
Has manufacturer of press furnished instructions for care and maintenance?

B. Modification
Has modifier (if used) provided instructions for care and maintenance?

C. Training of Maintenance Personnel
Have employers properly trained their maintenance personnel for inspecting and maintaining production systems utilizing presses, including a lockout or tagout procedure?

D. Inspection and Maintenance
Does employer have a periodic and systematic program for inspecting and maintaining their presses to ensure that all the press parts, auxiliary equipment and safeguards are in safe operating condition and adjustment?

E. Die Cushion
If used, is it used within pressure rating?

F. Installation
Are presses arranged so that they don't move (walk) during production operations?

Compliments of

"The Machine Safeguarding People"

ROCKFORD SYSTEMS, INC.

Rockford, Illinois

MECHANICAL POWER PRESS INSPECTION REPORT

SEE OSHA SUB-PART O, 1910.217 (e)

	INSPECTION PERIOD DATE		
	OK DATE	MAINT. REQ'D	DATE REPAIRED
1 - FRAME			
Cracked			
Broken			
Loose Tierods			
Loose Brackets or Components			
Frame Caps - Secure			
2 - LEGS			
Cracked			
Secure to Frame			
Leg Tie Rods in Place & Secure			
Inclining Mechanism Properly adjusted			
3 - POINT OF OPERATION			
Guards in Place and Secure			
Adjusted Properly			
Devices Being Used Properly			
Devices Adjusted Properly			
Hand Tools Being Used if Req'd			
Warning or Caution signs in place			
4 - KNOCKOUT BAR			
Proper Adjustment			
Broken Brackets			
Bent Adjusting Screws			
Bent Bar			
Brackets Secure			
5 - PNEUMATIC SYSTEM			
Check for Air Leaks			
Hoses			
Filter			
Lubricator			
Regulator			
Pressure Gauge			
Other			
6 - COVERS			
Flywheel - In Place and Secure			
Gear - In Place and Secure			
Clutch - In Place and Secure			
Brake - In Place and Secure			
Feed & Scrap Shear in Place			
7 - FULL REVOLUTION CLUTCH			
Engaging & Disengaging Problems			
Condition of Clutch & Clutch Engagement Heads			
Condition of Springs, Latch Cushions & Rollers			
Condition of Latch, Trip Lever & Rod			
Loose Tripping Cylinder Mtg. Bracket			
Proper Setting & Condition of Non-Repeat			
Proper Lubrication			
8 - PART REVOLUTION CLUTCH - AIR - MECHANICAL			
Engaging & Disengaging Problems			

	INSPECTION PERIOD DATE		
	OK DATE	MAINT. REQ'D	DATE REPAIRED
Proper Stopping Position			
Lining Wear			
Clutch Shoes in Place and Secure			
Broken or Weak Springs			
Check for Air Leaks			
Proper Air Pressure			
Air Line Filter Clean			
Air Exhaust System Clean			
Clutch Properly Lubricated			
Surge Tank Drained			
9 - BRAKE			
Brake Collar Tight on Shaft			
Lining Wear			
Properly Adjusted			
Broken or Weak Return Spring			
Brake Mtg. Bracket Secure			
Proper Air Pressure			
Check for Air Leaks			
10 - SLIDE COUNTERBALANCE			
(Spring Type) Broken			
Properly Adjusted			
(Air Type) Broken			
Proper Air Pressure to Balance			
Slide and Die Connections			
Proper Lubrication			
Surge Tanks Drained			
11 - CONTROLS & ELECTRICS			
Condition of Hand Switches & Trip Buttons			
Condition of Relays			
Pitted Contacts			
Loose Connections			
Condition of Wires & Insulation			
Check Operation of Two-Hand Controls			
Anti-Tie Down, Anti-Repeat			
Foot Controls			
Stop Controls			
Stroke Selection			
Ground System			
All Lights Working Properly			
Disconnect Switch & Fuses			
Motor Starter & Overloads			
Solenoid Valve(s)			
Limit Switch(s)			
Keys for Panel Door & Selector Switches			
Power Ram Controls			
Brake Monitoring System			
Interlocked Barrier Guard			
Interlocked Safety Block			
Presence Sensing Device			
Mat'l Feeding Equipment			

(CONTINUED ON BACK)

MECHANICAL POWER PRESS INSPECTION REPORT
(CONTINUED)

12 - LUBRICATION	INSPECTION PERIOD DATE OK DATE	MAINT. REQ'D	DATE REPAIRED
Lubricator Functioning Prop.			
Press Lub. Prop. (Visual)			
Prop. Oil Level in Slide Adj.			
Oil or Grease in Reservoir			
Broken or Leaking Lines or Fittings			

13 - BEARINGS			
Mains - Clearance			
Connection Rod - Clearance			
Flywheel Bearing - Clearance			
Ball Seat or Wrist Clearance			
Slide Ways & Gibs Scoring			
Anti-Friction Properly Lub.			
Anti-Friction - Loose or Worn			
Connection Screw Clamp - Secure			

14 - GEARS			
Check for Tightness			
Check for Wear			
Uneven Wear - Bent Shaft			
Looseness on Shaft - Key, Bore			
Cracked or Broken Teeth			
Proper Lubrication			

15 - FLYWHEEL - SHEAVE & BELTS			
Flywheel Loose on Shaft			
Sheave Grooves Aligned with Flywheel Grooves			
Belt Wear			
Proper Belt Tension			

16 - MOTOR			
Secured to Bracket			
Bracket Secure to Press			
Motor Bracket Hinge Pin Wear			
Adjusting Mechanism Secure			
Exposed Wires			

17 - OVERLOAD			
Does Press Appear Overloaded?			
Further Inspection Req'd.			

18 - AIR BLOW OFF			
Hoses & Fittings			
Proper Adjustment			

19 - PNEUMATIC CUSHION			
Air Controls Adjusted Prop.			
Lines & Fittings			

20 - CLEAR OF SCRAP & DEBRIS			
Well Lighted			
Oil Splatter			
Noise Level			

21 - LEVEL			
Press Level			
All Press Pads Contacting Floor			

22 - INHERENT HAZARDS	INSPECTION PERIOD DAT' OK DATE	MAINT. REQ'D	DATE REPAIRED
Spring Loaded Turnover Bar			
Drive Belts			
Chains			
Springs			
Protective Covers			
Protective Cover Brackets			
Mountings			
Fasteners			
Other			

23 - OPERATOR COMMENTS:

Operator Name	Clock No.		
Press Sticking on Bottom			
Press Repeats			
Auto Ejection System			

Other Operator Comments:

24 - REMARKS

25 - CHECK BY:

DATE

Prop. Ser. No.

Mfg.

Type

Tonnage

PRESS INSPECTION REPORT

Company _____

Building _____ Department _____ Press No. _____

PART INSPECTED	✓ OK	DEFECTIVE CONDITION	CORRECTIVE ACTION	DATE REPAIRED
1. Frame				
2. Motor				
3. Flywheel				
4. Gears (If furnished)				
5. Crankshaft				
6. Clutch				
7. Brake				
8. Slide and Gibs				
9. Connection (Pitman) and Side Adjusting Screw				
10. Slide Counter - Balance (If furnished)				
11. Air System				
12. Electrical System				
13. Foot Switch				
14. Point Of Operation Safeguarding				
A) Guarding				
B) Presence Sensing (Light Curtain or Radio Frequency)				
C) Pullback (Pullout)				
D) "A" or "B" Gate (Movable Barrier)				
E) Restraint (Hold-out)				
F) Two-hand Trip or Control				
15. Miscellaneous				

Inspected By	DATE	☐ Approved for Use	☐ Not Approved

USE REVERSE SIDE IF NEEDED

GUIDE FOR THE INSPECTION OF MECHANICAL POWER PRESSES

Inspection of	Inspect for code violations, defects, missing malfunctions, maintenance*
1. Frame	Cracks? Broken or loose parts? Loose hold down bolts?
2. Motor	Clean? Lubrication? Overheating?
3. Flywheel	Rotates in correct direction? Free running? Covered?
4. Gears	Loose? Broken or cracked teeth? Excess noise? Proper lubrication?
5. Crankshaft	Cracks? Bent? Proper clearance in bearings?
6. Clutch	Full Revolution: Single stroke capability, loose or worn parts, including linkage? Weak or broken springs? Compression springs operating on rod, or guided within hole or tube? Properly adjusted? Part Revolution: Air or oil leads? Proper alignment? Disengagement? Stopping position? Worn clutch lining? Weak or broken springs? Power or air pressure failure or deactivation? Momentary operation of stop control applies brake and releases clutch? Retripping required? Red stop button?
7. Brake	Brake lining worn? Brake properly adjusted? Does it stop slide quickly? Are friction brakes set with compression springs operating on rod, or guided within a hole or tube?
8. Slide and gibs	Face of slide parallel to bolster? Proper gib clearance? Any scoring?
9. Connection (pitman) & slide adjusting screw	Proper bearing and ball seat clearances? Screw turns freely?
10. Slide counterbalance	Spring Type: Proper adjustment? Broken springs or loose nuts? Pneumatic Type: Air leakage? Proper air pressure? Loose connection to slide?
11. Air System	Proper air pressure? Valve operation? Pressure guages? Leaks?
12. Electrical System	Can main power switch be locked only in "off" position? Grounding? Condition of wiring? Relays? Rotary limit switches? Solenoids? Motor starter disconnects from voltage fluctuation or power failure? Retripping required? Is any component bypassed?
13. Foot Switch	Nonslip pad on contact area? Shielded from accidental operation?
14. Point of Operation Safeguarding	A) Guarding - Barrier that prevents entry of operator's hands or fingers into the point of operation area? Adjustment and maintenance? Pinch points remaining in adjacent areas? B) Presence Sensing (Light curtain or radio frequency - part revolution clutch only) - Reliable design and proper electrical tie-in to control? Fixed at proper "Safety Distance" from pinch point? Barrier guards for other hazardous point of operation areas? C) Pullback (Pullout) - Enough or too much pull on cables? Is proper adjustment being made for change in operator, die, shift? Records of inspection/maintenance being kept? D) "A" or "B" Gate ("B" gate for part revolution clutch only) - Point of operation enclosed before press cycle can be initiated? Barrier guards for other hazardous point of operation areas? E) Restraint (Hold-out) - Adjusted so that operator's fingers cannot reach into dies? Securely anchored? Adjusted for each operator, die, shift? F) Two-hand Trip or Control (Two-hand control for part revolution clutch only) - Shielded against unintended operation? Concurrent, anti-repeat? Fixed in place at proper "Safety Distance" from pinch point? Interrupted stroke protection and adequate "Holding Time"(for Two-hand control only)?
15. Miscellaneous	Comment on any other items such as: Protection from falling overhead parts. Lighting. Cleanliness. Lubrication. Pressure vessels. Hydraulic equipment. Auxiliary equipment. General maintenance. Special types of clutches or brakes. Covering of gears, belts, pulleys. Overloading. All auxiliary equipment.

*Refer to Federal Occupational Safety & Health Standards, (OSHA) 1910.217,ANSI B11.1 & B15.1, and other applicable codes.

Compliments of
"The Machine Safeguarding People"
ROCKFORD SYSTEMS, INC.
Rockford Illinois

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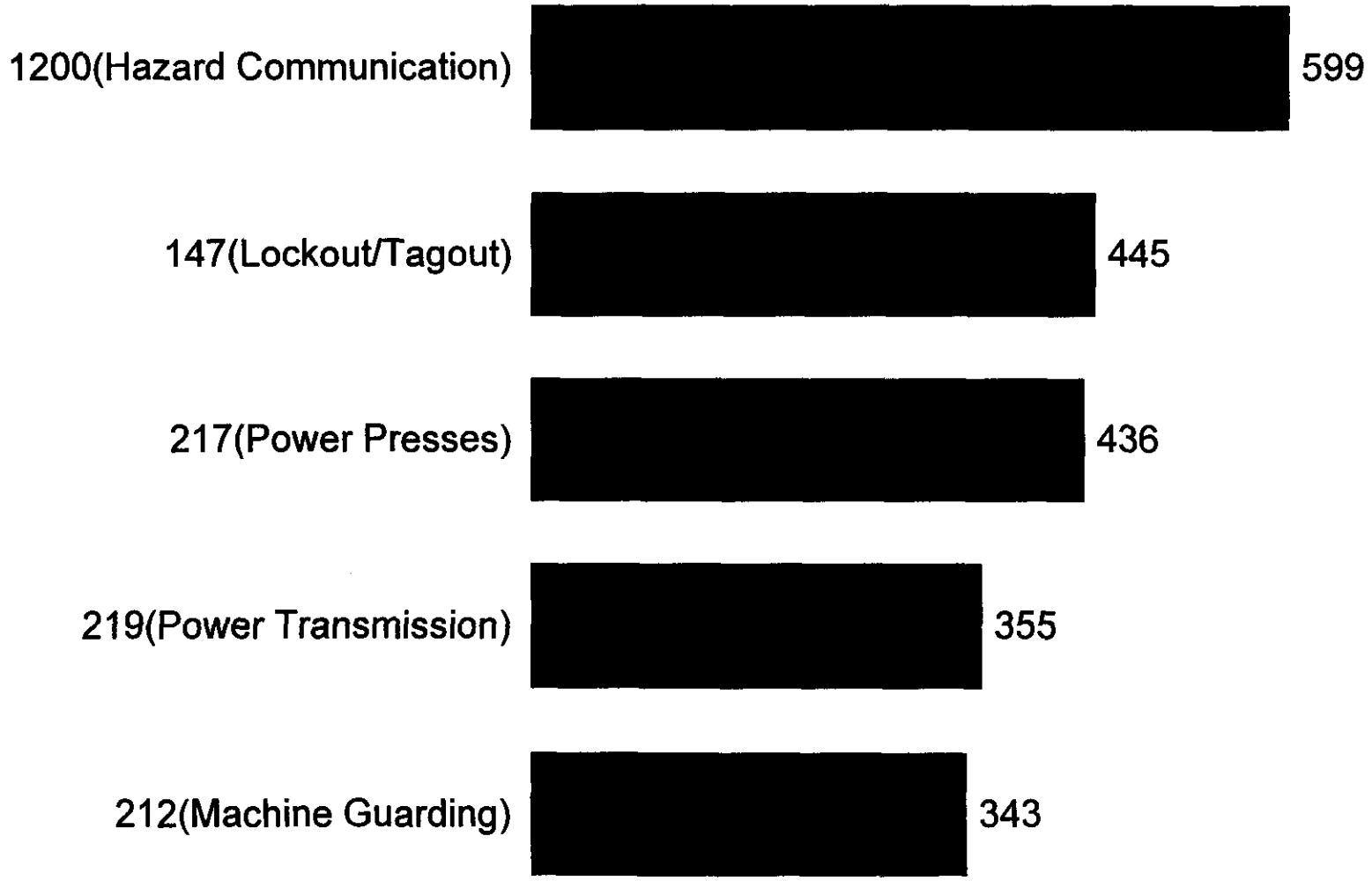
Frequently Cited Standards - FY 96

Fabricated Metal Products

1910.



5 Concerns on any Machine

Safeguarding - *guard, device, method*

Controls - *control reliability*

Disconnect - *lockable in off position*

Starter - *magnetic (for drop-out protection)*

Covers - *rotating components covered to 7 ft. from floor or from working platform*

Point-of-Operation Safeguarding for Mechanical Power Presses

GUARDS - Prevent Access
DEVICES - Control Access
to Point-of-Operation Hazards

Guards

1 - die enclosure
2 - fixed
3 - interlocked
4 - adjustable

Devices

1 - presence sensing
(light curtains or radio frequency)
2 - pullback
3 - restraint
4 - gates ("A" or "B" type)
5 - two-hand control
6 - two-hand trip

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Safeguarding Choices for Mechanical Power Presses

Full Revolution Clutch

1 - Guard

2 - Pullback

3 - Restraint

4 - "A" Type Gate

5 - Two-Hand Trip

Part Revolution Clutch

1 - Guard

2 - Pullback

3 - Restraint

4 - "A" or "B" Type Gate

5 - Two-Hand Control

6 - Presence Sensing Device

Safeguarding/Training Checklist for Mechanical Power Presses

Two-Hand Controls used for single-stroke must be tested for:

concurrent:	Press one palm button at a time — machine should not cycle unless both buttons are pressed at the same time. Keep time setting adjusted to minimum.
anti-repeat:	Hold down both buttons for an entire cycle — the press should "top-stop." Both buttons must be released and pressed again to get another single stroke. Test both left and right palm buttons by continuing to hold one down at the end of a cycle and trying to initiate another single stroke with the other button.
holding time:	Both palm buttons must be held down during the downstroke before you can release them. Letting go during the downstroke should stop that cycle.
interrupted stroke protection:	Press both palm buttons to begin a single stroke. Releasing one palm button during the downstroke should stop that cycle. Re-initiating the palm button that you released should not continue the cycle. Only when you release both palm buttons and press both buttons again should the press finish that cycle.

Never use a "cheat stick" or any object that allows you to have one or both hands free while using the two-hand control buttons. The two-hand control buttons were designed to safely occupy both of your hands during the downstroke.

Never leave keys in selector switches. The only time that a key should be in any selector switch is when the key position is being changed.

If you are assigned a key, you must keep it with you: either in your pocket or on a retractable key chain. Federal law requires that you be trained in the proper use of such keys and that all safety related training be documented and kept on file.

Never use "Inch" as a substitute for "Single Stroke" during production because it bypasses safety features and could cause you to be injured.

The "Safety Distance" between your palm buttons and the hazard was put there for a (safety) reason. Never attempt to move the palm buttons closer to the hazard or you may become injured!

Name _____

Department _____ **Machine#** _____ **Date**_____

Compliments of:
"The Machine Safeguarding People"
ROCKFORD SYSTEMS, INC
Rockford, Illinois

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SAFEGUARDING APPLICATIONS CHART FOR MACHINES

GUARD, DEVICE OR METHOD	Intended Function								Machine Application										Type of Protection							Other Characteristics				COMMENTS
	Prevent Entry	Prevent Cycle Start	Initiate Cycle	Stop Cycle	Withdraw Hands	Occupy Hands at Safe Distance	Hands at Safe Distance Via Size/Shape of Part	Make Operator Aware of Unsafe Location	Mech. Power Press Full Revolution Clutch	Mech. Power Press Part Revolution Clutch	Hydraulic Power Press	Power Press Brake	Power Shear	Milling Machine	Drill Press	Lathes	Spot Welder	Riveter Eyeletter/Staker	"Protection" at the Point of Operation	Prevents Reaching into Point of Operation	Machine Repeat or Failing Slide/Die	Inadvertent Hand Motion	Shattering Metal	Flying Chips, Sparks, Coolant, Etc.	Protects Others as Well as Operator	Freedom of Movement	Level of Productivity	Maintenance and Adjustment Required	Tamperability	
Barrier Guard (Non-Intrickd.)	X								X	X	X	X	X	X		X			X	X	X	X	X*		X	N/A	Exc.	High	High	*If Solid Barrier Used
Barrier Guard (Interlocked)	X	X							X[A]	X	X	X	X	X		X			X	X	X	X	X[B]		X	N/A	Exc.	High	High	A - Limited Application B - If Solid Barrier Used
Presence Sensing																														
Light Curtains		X		X						X	X	X							X			X			X	Exc.	Exc.	Low	Low	Side/Back Prot. Also Req'd
*Light Curtains w/ P.S.D.I.		X	X	X						X	X								X			X			X	Exc.	Exc.	Low	Low	*Not Yet Allowed by OSHA
Radio Frequency		X		X						X	X								X			X			X	Good	Exc.	High	High	
Pullback (Pullout)					X	X			X	X	X	X							X		X*	X				Fair	Exc.	High	Med	*If Attached to the Upper Die
Restraint (Holdout)	X					X			X	X	X	X	X						X	X	X	X				Fair	Good	Med.	High	Normally Used in Conjunction with Hand Feeding Tool
Type "A" Gate (Moveable Barrier)	X	X							X	X	X								X		X[A]	X	X[B]		X	Exc.	Fair	Low	Low	A - Prot. From Repeat Only B - If Solid Front Used Side/Back Prot. Also Req'd
Type "B" Gate (Moveable Barrier)	X	X								X	X	X							X			X			X	Exc.	Good	Low	Low	
Two-Hand Control			X	X		X				X	X	X							X*			X				Exc.	Good	Low	Low	*Must be Mounted at Sufficient Safety Distance and/or Used w/Other Safeguarding
Two-Hand Trip			X			X			X				X						X*			X				Exc.	Good	Low	Low	*Must be Mounted at Sufficient Safety Distance and/or Used w/Other Safeguarding
"Safe Holding" (Safe Distance)						X	X					X		X		X				X						Exc.	Exc.	N/A	N/A	Normally Recognized as a "Last Resort" Safeguarding Method for Some Machines
OTHER PROTECTION																														
Chip/Splash Shield	X													X	X	X	X			X*		X*	X*	X	X	N/A	Good	Med.	High	*Limited (Could Reach Around)
Pressure Sensitive Mat		X		X				X		X	X	X		X											X	N/A	N/A	Low	Low	To be Used for Auxiliary Protection Only
Drop Probe Device		X						X									X	X				X		X*		N/A	Exc.	High	High	*Only if Custom Shaped Shield Attached to Drop Arm
Hand Tool						X			X	X	X	X	X				X	X								N/A	Good	N/A	N/A	Not to be Used as a Substitute for a Guard or Device
Awareness Barrier/Device/ Signal(Visual-Audible-Physical)								X					X	X	X	X									X	Exc.	Exc.	Low	Low	Normally Recognized as a "Last Resort"
Danger/ Warning Signs									X	X	X	X	X	X	X	X	X	X												Warns Operator to the likelihood and Degree of Potential Personal Injury or Damage

NOTE: SOME OF THESE GUARDS, DEVICES, AND METHODS MAY HAVE APPLICATIONS TO OTHER MACHINES NOT LISTED ON THIS CHART.

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